MULTIMEDIA UNIVERSITY

STUDENT ID NO

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# MULTIMEDIA UNIVERSITY

# FINAL EXAMINATION

**TRIMESTER 1, 2018/2019**

## PSP 0101 – PROBLEM SOLVING AND PROGRAM DESIGN

(Foundation in Information Technology)

17th OCTOBER 2018
9:00 A.M – 11:00 A.M
(2 Hours)

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**INSTRUCTIONS TO STUDENT**

1. This question paper consists of **THREE** pages excluding the cover page.
2. Answer **ALL** questions.
3. Write your answers in the Answer Booklet.

**Instructions:** Answer **ALL** questions. Write your answers in the Answer Booklet.

**QUESTION 1 [25 Marks]**

a. Jake always travels from city to city. He knows that 40% of the time, he will be traveling for 60km per hour and the remaining 60% he will be traveling 110km per hour. Jake wants to know the time he will take to travel from one city to the next. The distance between two cities is a variable because he will be using the same equation when he travels to another city.

i. Identify the problem.

(1 mark)

ii. What do you understand from the problem?

(3 marks)

iii. Write the equation to solve this problem.

(2 marks)

b. Evaluate the following equations:

i. H = True AND 4 > 4 * 1 OR NOT 11 % 2 == 7

ii. M = 17 – 3 ^ (7 \ 2) + 12 * 2 + 2

(6 marks)

c. Ethan wants to create a program that can calculate the perimeter of a circle when the given input is the area of that circle. Create an IPO chart for this program.

(5 marks)

d. Mavis and Johnny split some amount of money inherited from Mr. Drac. The amount that Mavis received is 2 times the amount Johnny received. Mavis invested all her share at 5% interest per year and Johnny invested all his share at 6% interest per year. Write a pseudocode for a program to calculate and print the amount of money received by Mavis and Johnny and their combined total interest earned from their investments after one year.

(8 marks)

**Continued...**

## QUESTION 2 [25 Marks]

a. Body Mass Index (BMI) is a measure of health based on height and weight. It can be calculated by taking your weight in kilograms and dividing it by the square of your height in meters. The interpretation of BMI for people 20 years or older is as follows:

| BMI | Interpretation |
|---|---|
| BMI < 18.5 | Underweight |
| 18.5 ≤BMI < 25.0 | Normal |
| 25.0 ≤BMI < 30.0 | Overweight |
| BMI ≥30.0 | Obese |

Write a pseudocode for a program that obtains the weight in pounds and height in inches and interpret the calculated BMI. (Hint: kilograms per pound is 0.45359237 and meters per inch is 0.0254)

(16 marks)

b. Write a pseudocode for a program that checks whether a number is divisible by 2 and 3, by 2 or 3.
Example:
If the number entered is 4, the output will be "It is divisible by 2 or 3"
If the number entered is 7, there will be no output.
If the number entered is 12, the output will be "It is divisible by 2 and 3" and "It is divisible by 2 or 3"

(9 marks)

## QUESTION 3 [25 Marks]

a. Suppose that the tuition fee for a university is RM 10,000 this year and tuition fee increases 7% every year. In how many years will the tuition fee be doubled? Write a pseudocode using While/WhileEnd loop structure for a program that performs the computation.

(10 marks)

b. Draw a flowchart for a program that prompts user for two positive integers and finds their greatest common divisor.

(15 marks)

**Continued...**

## QUESTION 4 [25 Marks]

a. The factorial of a non-negative integer n, denoted by n!, is the product of all positive integers less than or equal to n. For example,

1! = 1
2! = 2 * 1 = 2
4! = 4 * 3 * 2 * 1 = 24

Note that the value of 0! is 1.

Write a function definition named **Factorial** that calculates the factorial of an integer. Your function shall accept an integer as parameter and return the result of the calculation. Use automatic counter loop structure.

(7 marks)

b. The parking rate for a car park is listed below.

| | First hour or part thereof | Every subsequent hour or part thereof |
|---|---|---|
| Monday – Friday | RM2 | RM1 |
| Saturday – Sunday | RM3 | RM2 |

For example:

Park for 1 hour on Monday, fee is RM2.
Park for 1 hour on Sunday, fee is RM3.
Park for 4 hours on Friday, fee is RM5 (2+3*1).
Park for 5 hours on Saturday, fee is RM11 (3+4*2).

Write a complete pseudocode to calculate the parking fee. Your pseudocode shall include the following functions:

i. A function definition named **GetInfo** that gets user input for day and hour(s) parked

ii. A function definition named **CalcParkingFee** that calculates the parking fee based on the day and hour(s) parked obtained in GetInfo function.

iii. A main function that calls the above two functions and also print the parking fee.

Choose your function parameters and return values adequately.

(18 marks)

**End of Paper**